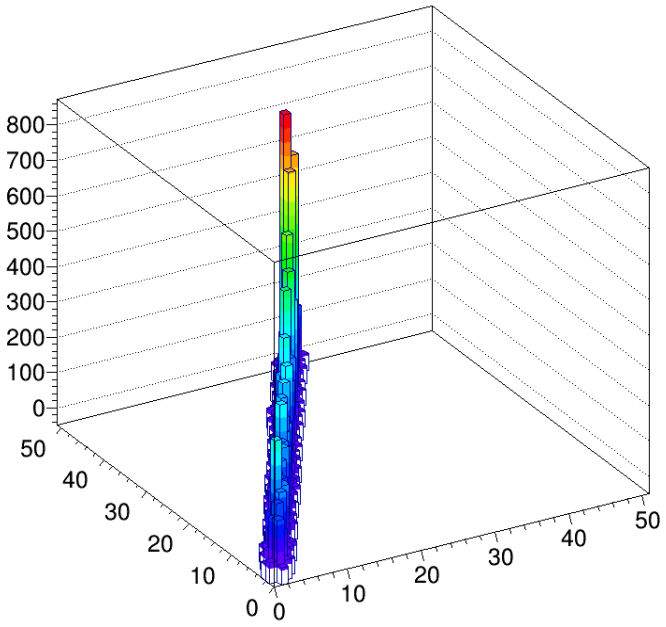
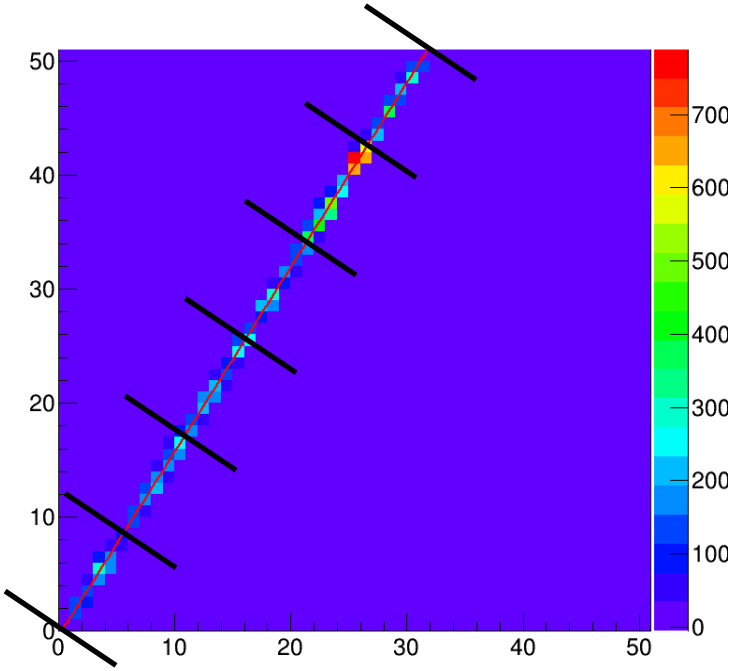
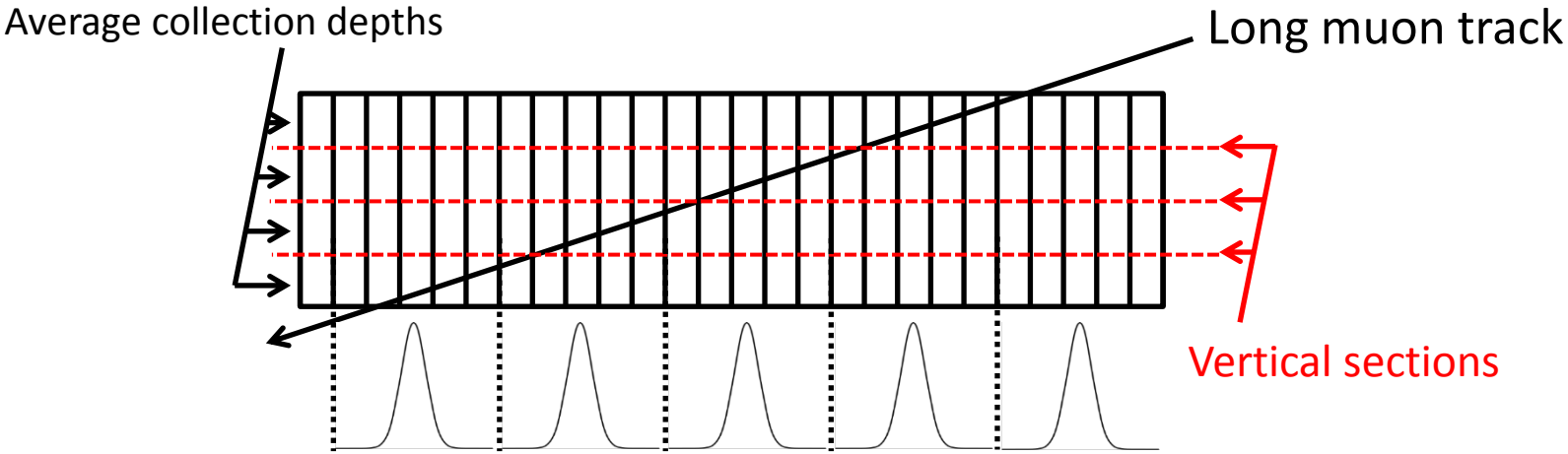
Group meeting – Feb 2015

Merlin Fisher-Levine

Measuring PSF Reminder (1)







Measuring PSF Reminder (2)

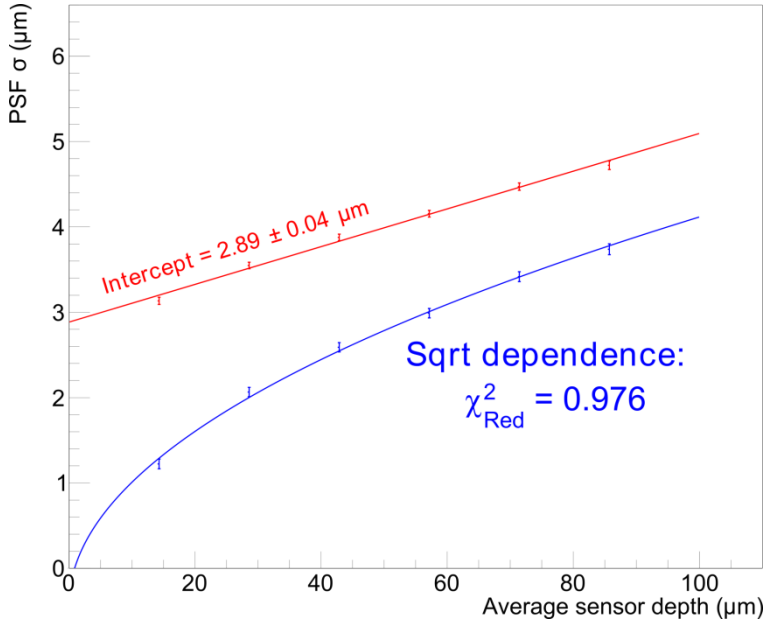
- Average all tracks segment PSFs together
  - (after tagging orientation!)
- Plot these average PSFs as a function of averaged depth in silicon

→ Get diffusion as a function of depth in silicon

$$\sigma = \sqrt{\sigma_0^2 + \sigma_{diff}^2}$$

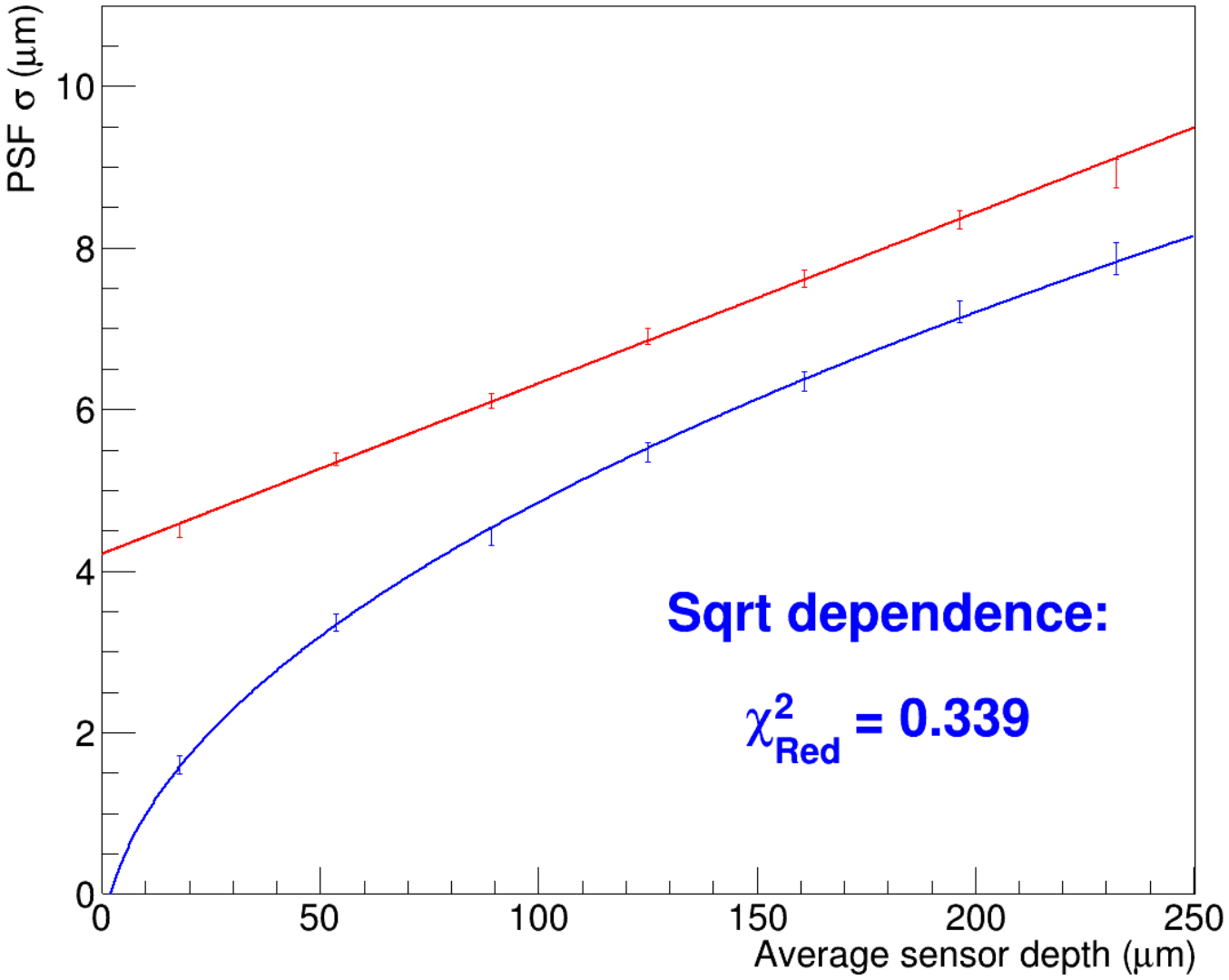
$$\sigma_{diff}(\Delta z) = \sqrt{2\frac{kT}{e}\frac{D\Delta z}{V}}$$

σ is the total PSF
σ_0 is the intrinsic resolution of the pixel detector (expect pitch / $\sqrt{12}$)
σ_{diff} is the contribution from diffusion



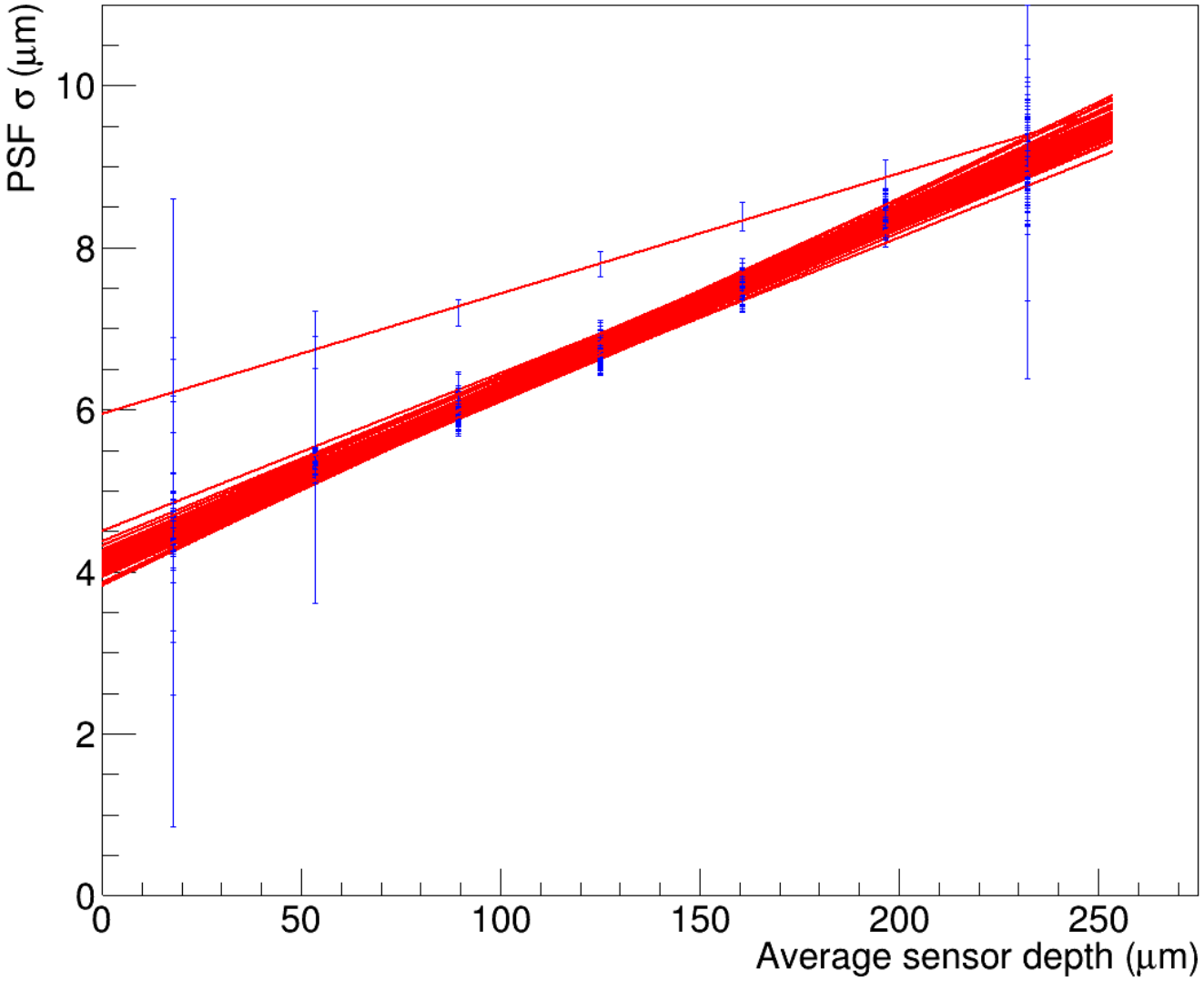
PSF vs Depth in DECam

- Results for a single sensor
- (N01 for those well acquainted with DECam)



PSF vs Depth in DECam

- All PSF measurements together
- All tightly bunched except for one
- This sensor is known to be bad
- (N30 for DECam fans)
  - Confirms measurement technique

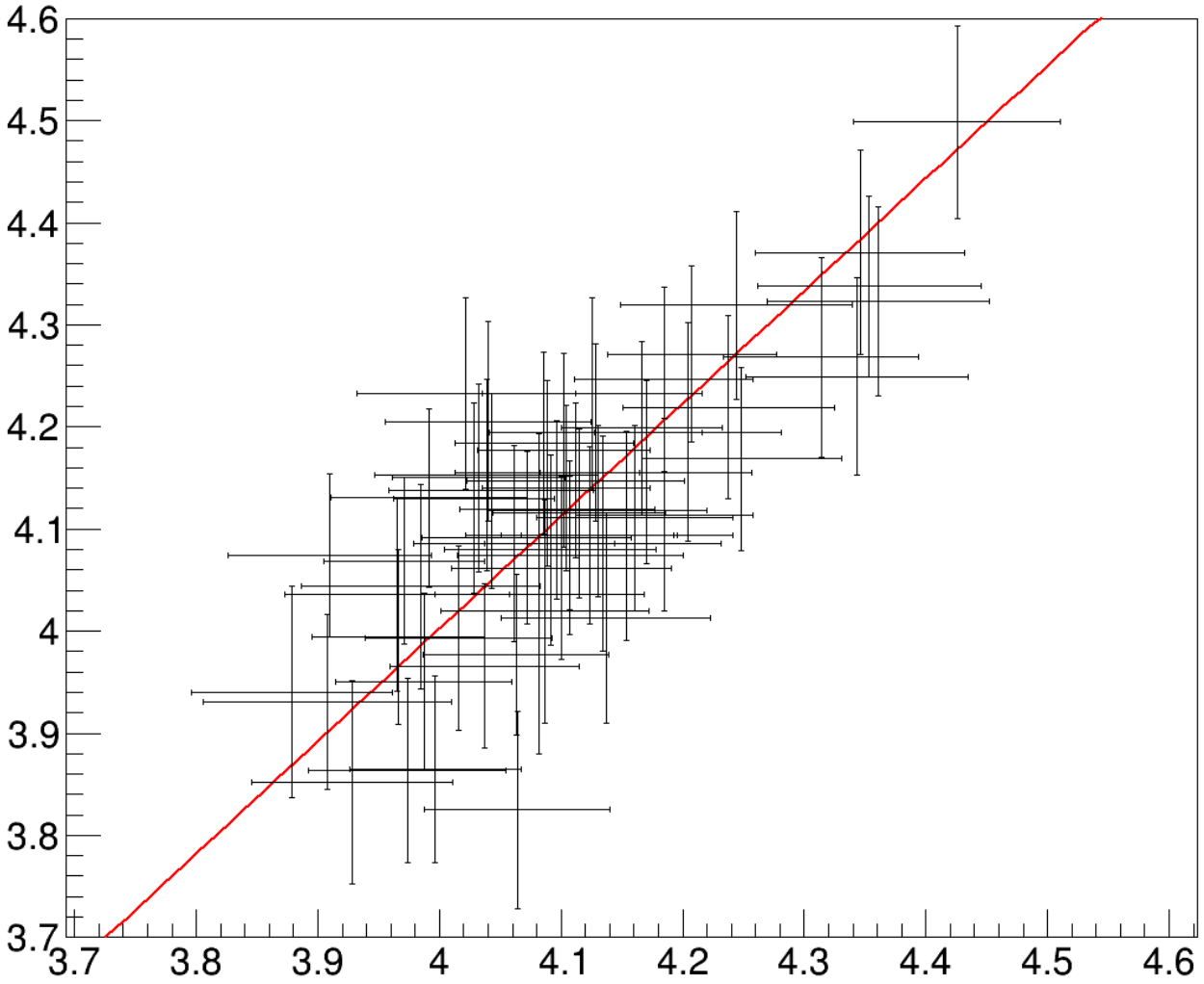


Sanity check – dataset comparison

- Two datasets of darks were analysed
  - One heterogeneous set
    - Assorted dates, assorted exposure times, mixed RA-dec etc
    - Lots of integrated exposure time
  - One homogenous set
    - All exposure times the same
    - Taken on 5 consecutive nights
    - Taken specifically for this purpose
    - Less integrated exposure time

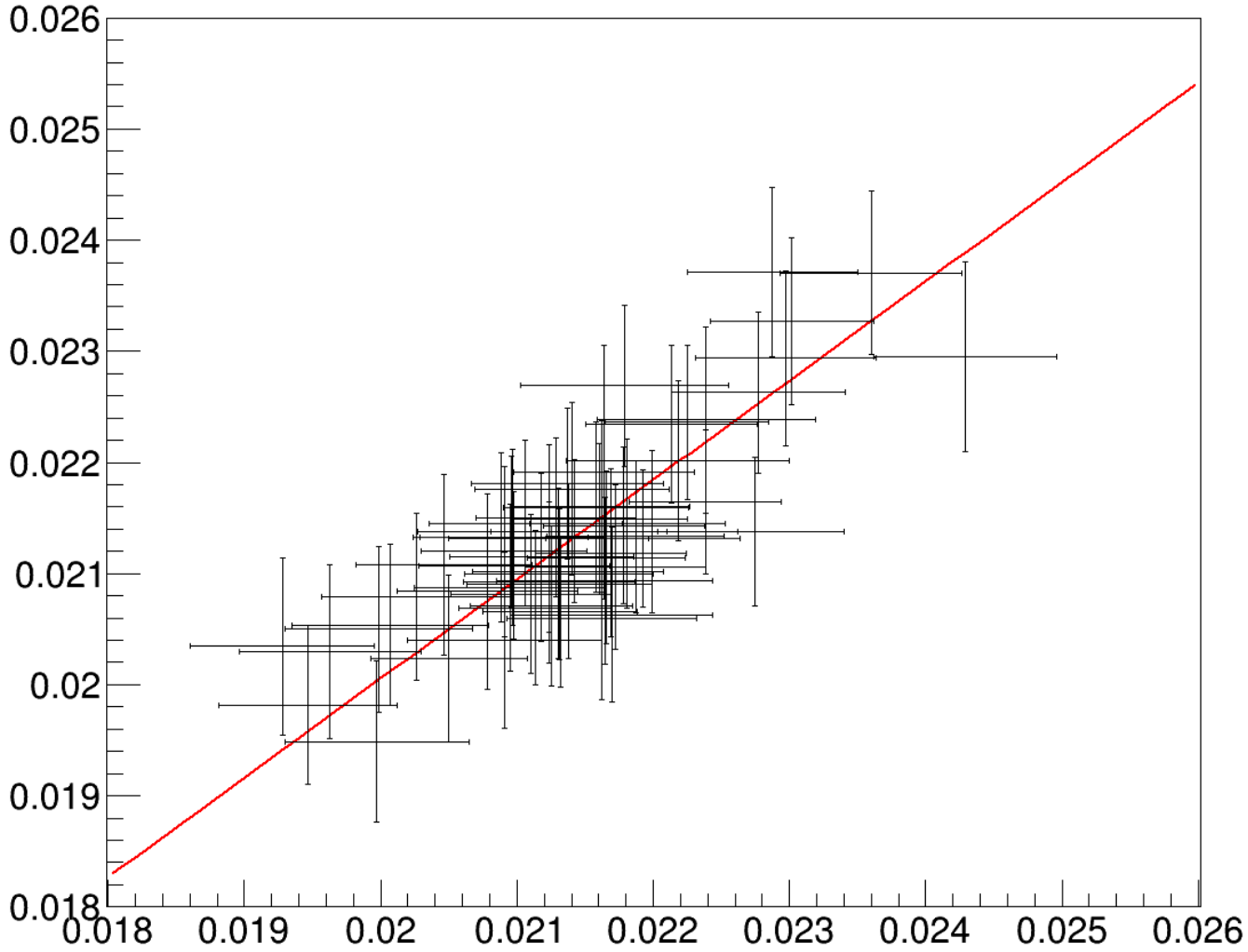
Sanity check – dataset comparison

Sigma_0



Sanity check – dataset comparison

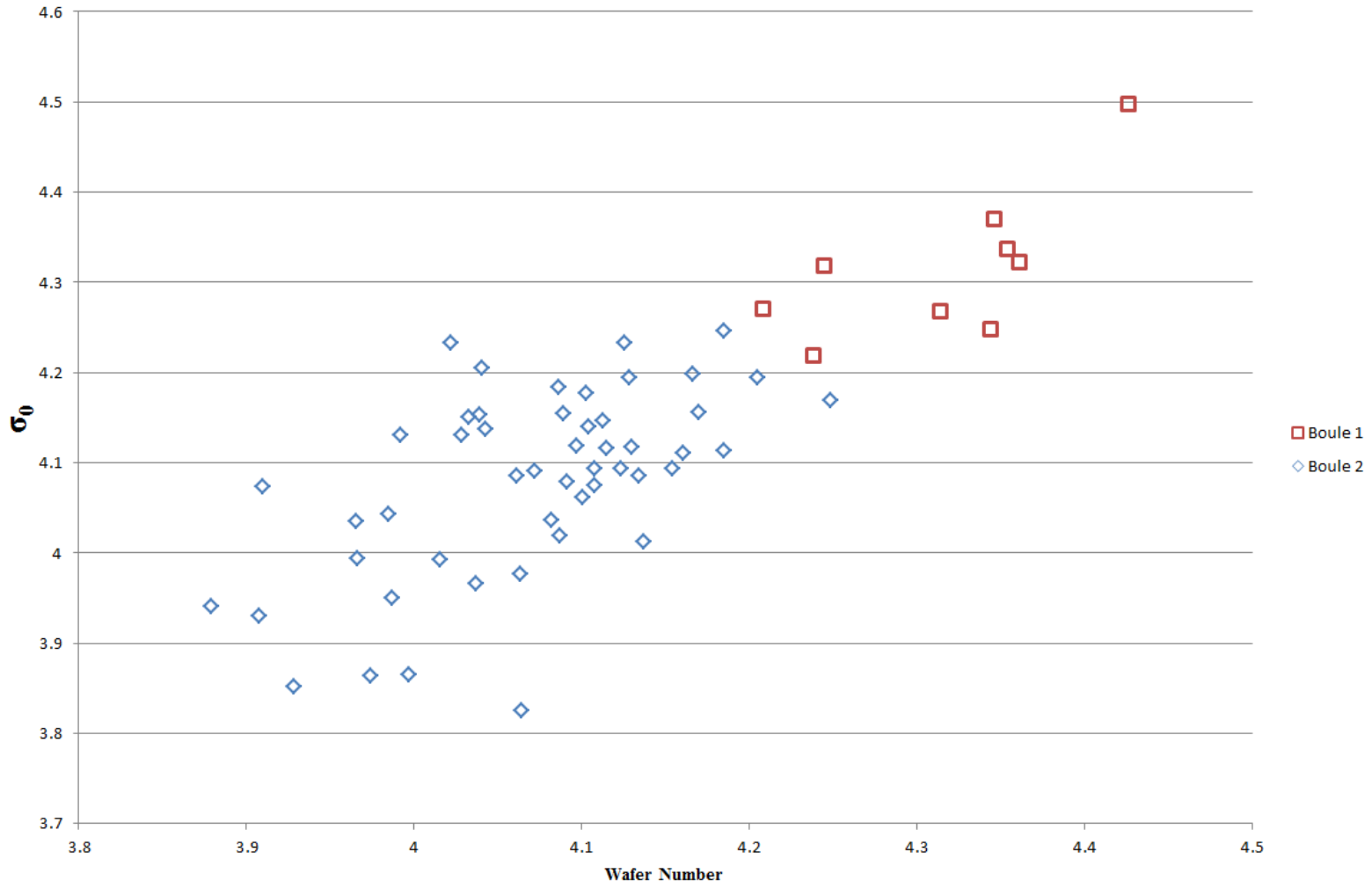
Gradients



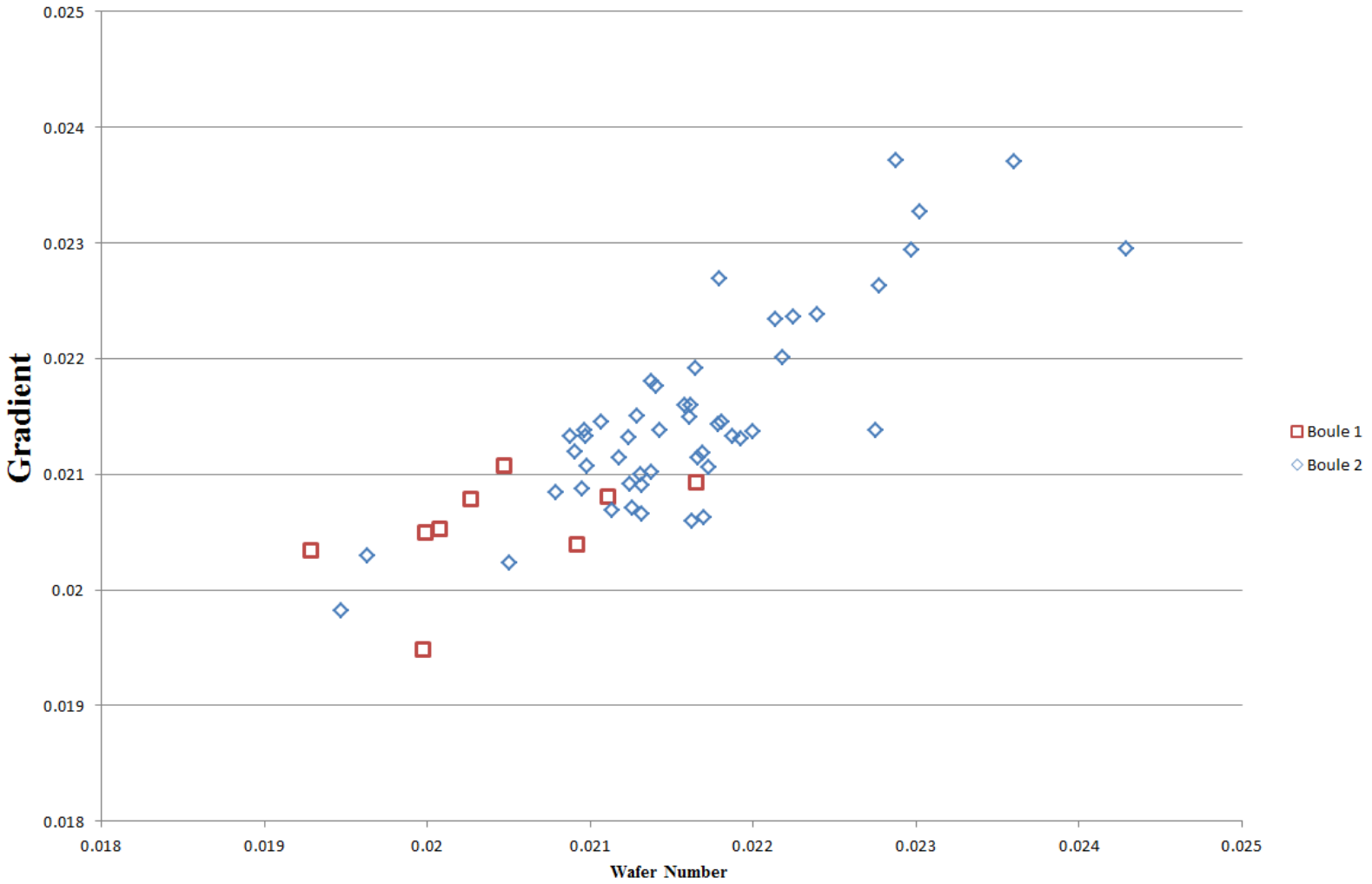
Boule-wise correlations

- Open to suggestions of how to better present this graphically…
- Taking the previous correlation plot and tagging by boule number gives:

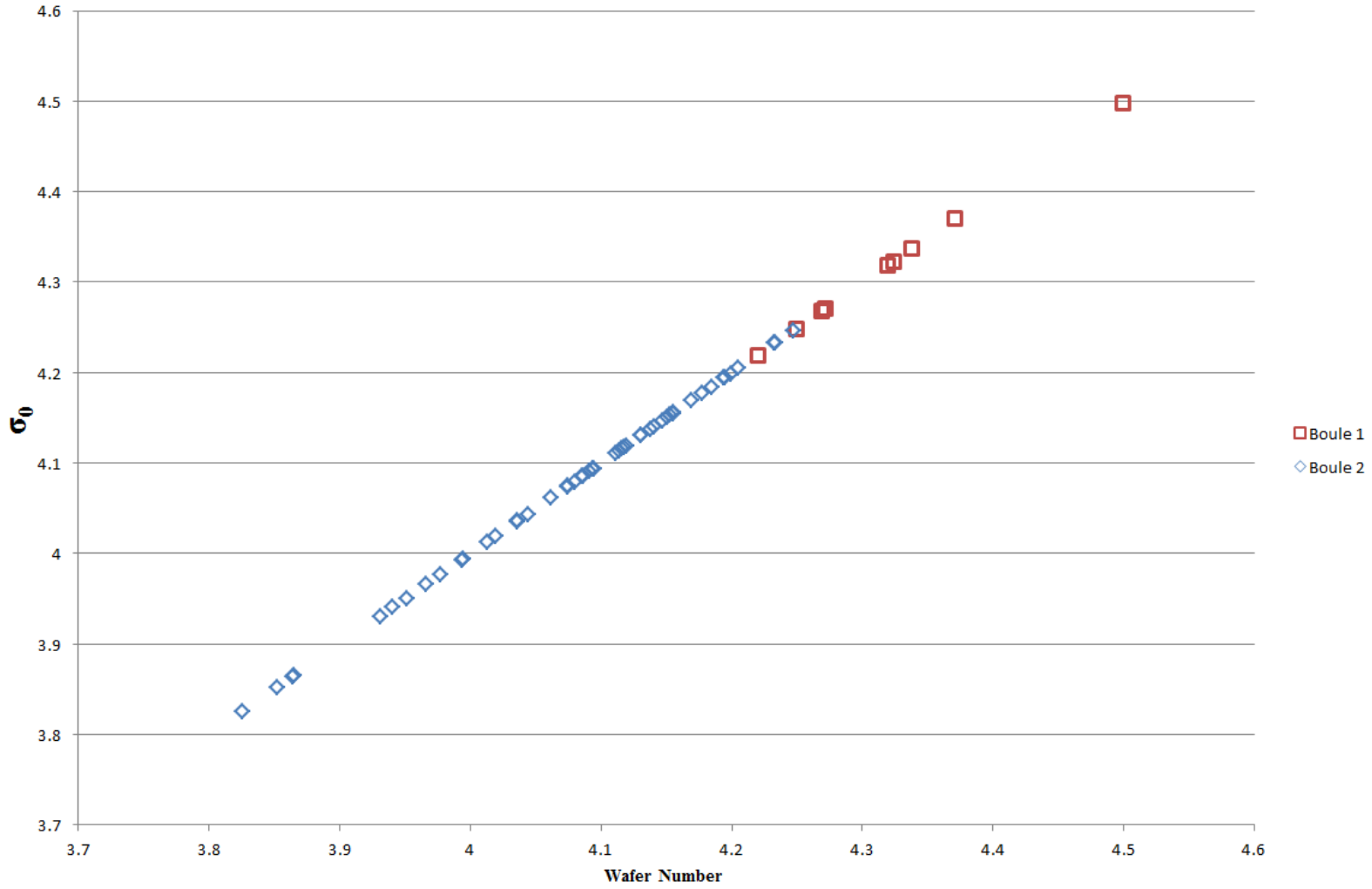
Boule-wise correlations



Boule-wise correlations



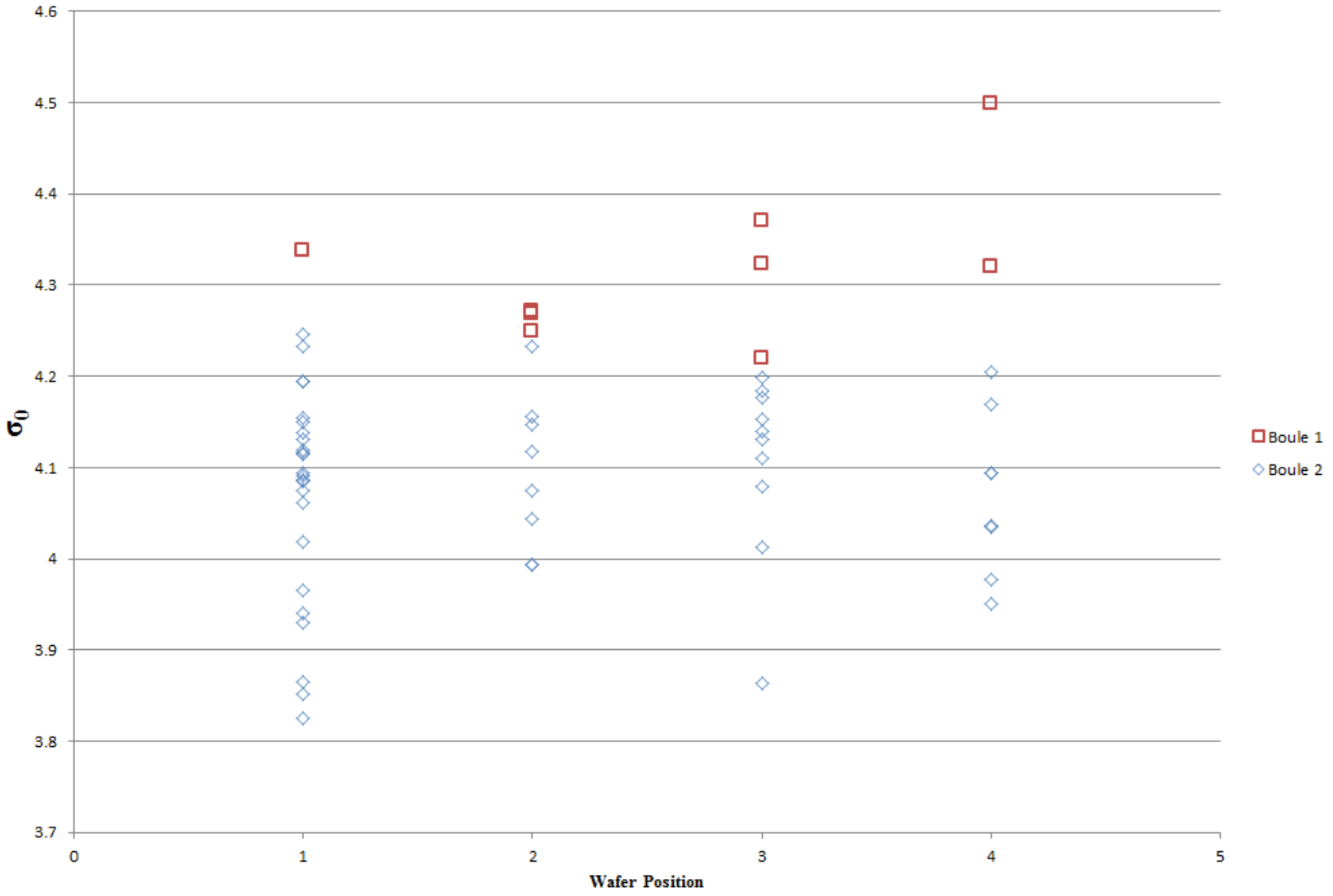
Boule-wise correlations



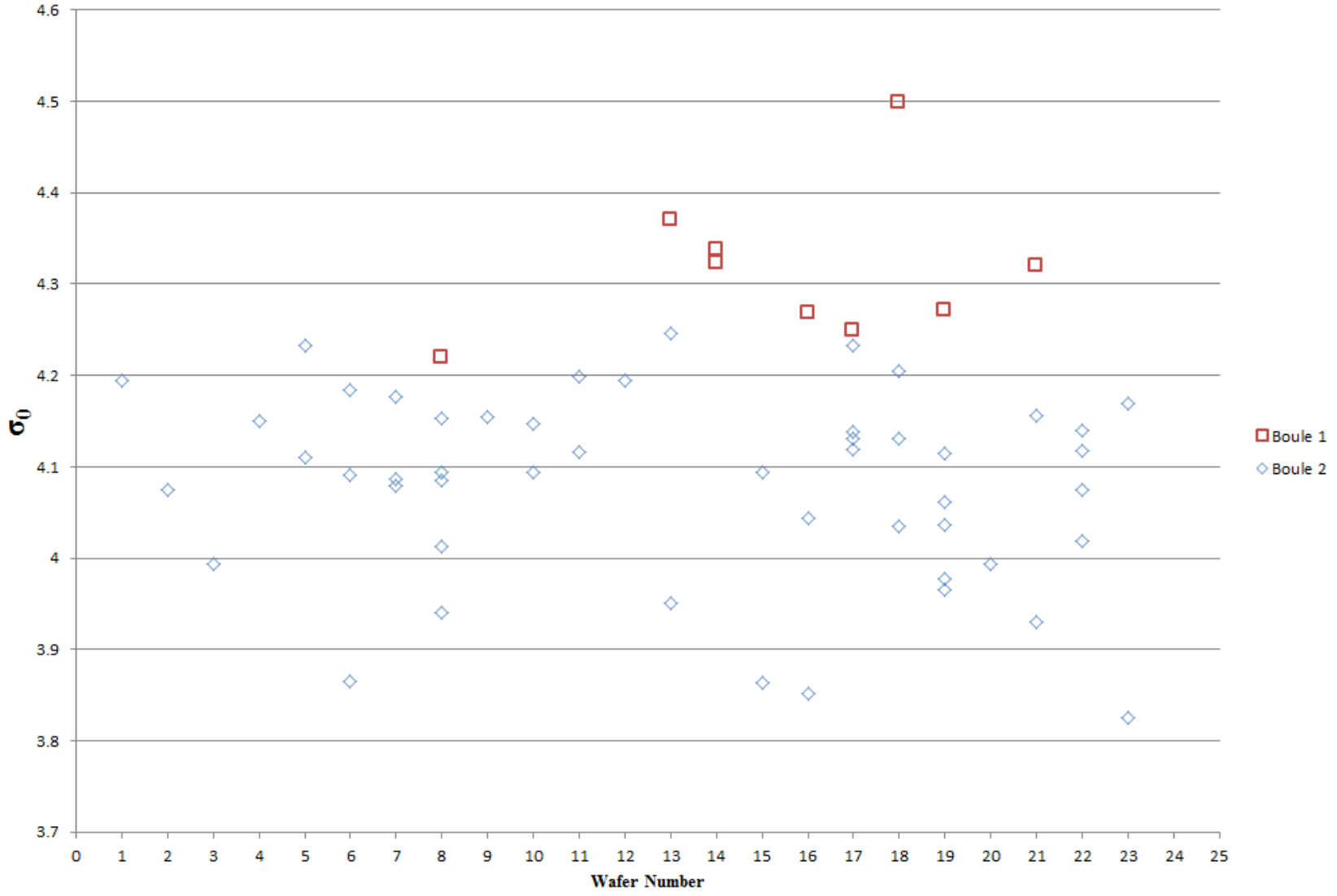
Further boule-wise analysis

- We also have the wafer number and wafer position for each sensor
  - i.e. the position in the wafer from which the sensor was cut
  - And *presumably* the position in the boule from which the wafer was cut
    - Do not know if the numbering is sensible, but have assumed so for now – need to check with manufacturers

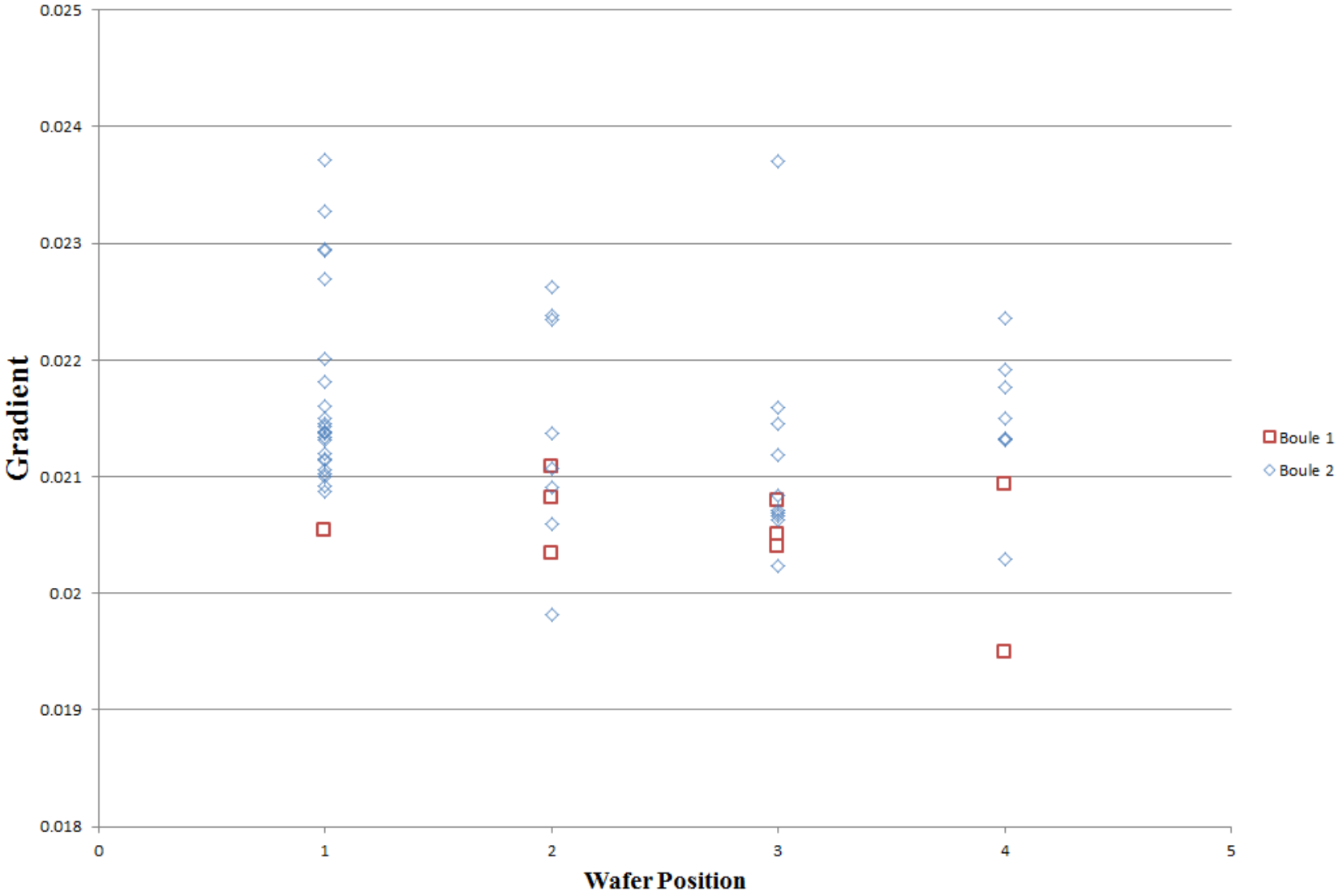
Wafer position vs σ_0



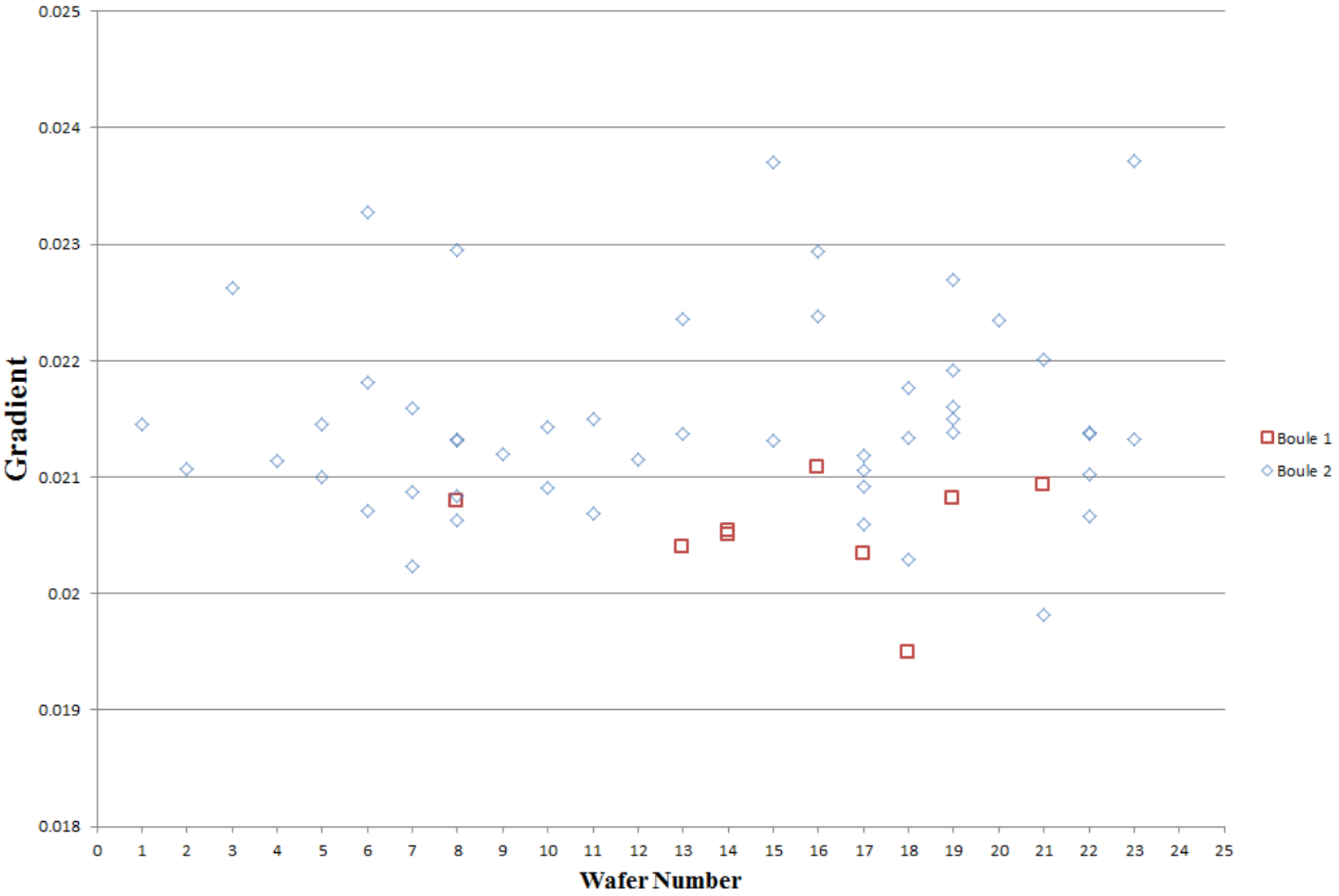
Boule position vs σ_0



Wafer position vs diffusion coeff.



Boule position vs diffusion coeff.



Comments/suggestions please